

# 油價、貨幣供給及利率差對實質變數之影響

## The Impact of Oil-Price, Money Supply, and Spread on Real Variable

計畫編號：NSC 87-2415-H-032-022

執行期限：86 年 8 月 1 日至 87 年 7 月 31 日

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### 一、中文摘要

最近的實證研究支持油價變化衝擊對產出具負向關係，且貨幣政策對產出具不對稱效果。本文檢定台灣的資料發現，非預期性的油價變化衝擊對產出具顯著負向的關係，而油價變化衝擊對產出則不具不對稱效果。在貨幣政策對產出之不對稱效果檢驗，實證研究結果發現，非預期性正的貨幣政策衝擊較非預期性負的貨幣政策衝擊對產出有較大的效果，而且對於貨幣政策方程式的不同設定並不影響本文的結果。

關鍵詞：非預期性的油價變化衝擊，不對稱效果，非預期性正的貨幣政策衝擊，非預期性負的貨幣政策衝擊

### 二、英文摘要

Recent empirical work has shown that oil price shocks has an adverse impact on the output and an asymmetry exists between the effects of positive and negative monetary policy shocks on output. This paper examines Taiwan data and finds that unanticipated oil price shocks have a statistically significant effect on output but an asymmetric effect does not exist. The empirical results of an asymmetry effect monetary policy on output found that unanticipated positive monetary policy shocks are shown to have a stronger effect on output than unanticipated negative monetary policy shocks. This result is robust across alternative specifications of the monetary policy equation.

**Keywords:** unanticipated oil price shocks, asymmetric effect, unanticipated positive monetary policy shocks, unanticipated negative monetary policy shocks

### 三、緣由與目的

緣由：

何種因素影響實質經濟變數的變動，為近年來經濟學熱烈討論的主題。Hamilton (1983)利用美國資料發現油價變化與 GNP 具強烈負向關係，Burbidge and Harrison (1984)利用不同的資料和估計方法也發現油與能源衝擊對實質變數產生顯著影響，而 Mork (1989) 證實油價變化對產出存在不對稱效果，亦即油價上升則 GNP 成長降低，而當油價下跌則對產出成長的影響為統計不顯著。Lee、Ni 與 Ratti(1994)發現建立在油價變化具相對穩定條件下，未預期的油價變化對總體變數具預測力，更重要的是，獲得和 Mork 相同的結果，即油價變化對產出具不對稱效果。

Cover(1992)利用 Mishkin(1982)所發展出之非線性聯合估計法檢定美國季資料發現，正的貨幣供給衝擊對產出無影響，相對地，負的貨幣供給衝擊引起產出的減少，而獲得貨幣供給衝擊對產出具不對稱效果。然而 Cover 未考慮將油價變數納入產出方程式成為一個額外的解釋變數，此外，Hamilton(1983)亦指出油價變化將影響貨幣當局所採行之貨幣政策，此隱含，如果油價變化對經濟衝擊是大且重要的話，貨幣當局會立即反應油價的衝擊而採增加或減少貨

幣供給來因應，明顯的在 Cover 的模型中，貨幣成長方程式亦未將油價變化納入，故將 Cover 的模型中，貨幣成長與產出方程式考慮油價變化因素將更能分析貨幣供給衝擊對產出是否具不對稱效果。

Friedman and Kuttner(1992)發現貨幣成長率未能解釋實質所得的變化，而商業本票與國庫券利率差對實質所得變數包含重要訊息。Bernanke(1990)認為利率差可作為衡量貨幣政策鬆緊之指標，主要因利率差包含貨幣與非貨幣因素。Kashyap、Stein and Wilcox(1993)考慮貨幣政策傳遞透過貸放管道，而認為利率差可作為貨幣政策位置(stance)之代理變數。Bernanke and Blinder(1992)也指出貨幣政策透過信用管道而傳遞。建立在上述理論，可觀察貨幣政策透過信用管道來影響實質產出。

目的：

建立在油價變化將影響總體變數包括實質 GNP 和失業率，和未預期油價變化對產出同樣具不對稱效果之理論下，本研究嘗試利用台灣資料進行上述理論之檢驗。

修正 Cover(1992)的模型，將油價變化因素加入貨幣成長與產出方程式，使貨幣供給衝擊之不對稱效果理論更符合實際經濟現象，利用台灣資料加以檢驗。

考慮貨幣政策透過信用管道影響實質產出，亦即檢驗利率差對實質產出之影響是否具有不對稱效果，利用台灣資料加以檢驗。

#### 四、結果與討論

國外實證研究支持油價變化對產出具負向關係，且非預期性負的貨幣政策衝擊比非預期性正的貨幣政策衝擊對產出有大的效果，此即為貨幣政策對產出之不對稱效果。為了驗證此一理論在台灣的適切性，本文將非預期性的油價變化衝擊由 GARCH 模

型導出，先驗證非預期性的油價變化衝擊對產出之不對稱效果。發現非預期性的油價變化衝擊對產出具顯著負向關係，而非預期性的油價變化衝擊對產出之不對稱效果似乎不具顯著性。而貨幣政策對產出之不對稱效果檢驗，不論貨幣政策用貨幣供給或利率差作為貨幣政策指標，實證研究結果發現，非預期性正的貨幣政策衝擊較非預期性負的貨幣政策衝擊對產出有較大的效果，此與 Shen(1996)所得的結論相一效。

#### 五、計畫成果自評

本研究利用台灣地區統計資料進行實證分析，觀察未預期的油價變化及未預期貨幣政策衝擊對產出的影響，有別於其他實證研究工作，對於未預期油價變數本研究採用 GARCH(p,q) 模型來獲得非預期油價衝擊變化，其方法如下：

$$\Delta P_t = a_0 + \sum_{i=1}^r a_i * \Delta P_{t-i} + \sum_{i=1}^s \beta_i * X_{t-i} + \varepsilon_t$$

$$\text{式中 } E(\varepsilon_t / I_t) = 0$$

$$E(\varepsilon_t^2 / I_t) = h_t$$

$$h_t = b_0 + \sum_{i=1}^q b_i * \varepsilon_{t-i}^2 + \sum_{j=1}^p b_{g=j} * h_{t-j}$$

式中  $\Delta P_t$  為油價變化， $X_t$  為解釋  $\Delta P_t$  變化之總體變數向量，未預期的油價衝擊可由下式獲得

$$e_t = \Delta P_t - \hat{\Delta P}_t$$

式中  $\hat{\Delta P}_t = E(\Delta P_t / I_{t-1})$ ，而  $I_{t-1}$  為直到 t-1 期可獲得之資訊。因為未預期油價衝擊( $e_t$ )未能反應其條件變異性，變數將由條件變異變之平方根來刻度(scaled)

$$e_t^* = \frac{e_t}{\sqrt{h_t}}$$

採用  $e_t^*$  較  $\Delta P_t$  或  $e_t$  之優點在於，其與實

質產出表現出更實際的聯繫關係，例如因暫時性油價變動所導致大的未預期油價衝擊（油價變化之大的預測誤差），未能對產出產生大的效果。再進一步將 $e_t^*$ 分解為正的油價衝擊( $e^{*+}$ )和負的油價衝擊( $e^{*-}$ )將可觀察油價變化對產出是否具有不對稱效果。

由於Cover(1992)的模型中，貨幣成長與產出方程式未能考慮油價變化因素，本文將未預期油價衝擊代入貨幣成長與產出方程式，以檢驗是否仍存在貨幣供給衝擊對實質產出具不對稱效果。由於本研究模型涉及貨幣成長與產出兩方程式，且在產出方程式中之變數包含有正的與負的貨幣供給衝擊，此正的與負的貨幣供給衝擊係由貨幣成長方程式所估計出殘差項經分解而得。為求更有效率的估計，本研究之計量技術採用非線型聯合估計(nonlinear joint estimation)貨幣成長與產出方程式體系。

為了更嚴謹討論貨幣政策對產出之不對稱效果，本文除採用貨幣供給作為貨幣政策之代理變數，以期實證結果更具頑強性，結果顯示出不同的貨幣政策指標仍得到一致的結論。後續研究者若欲針對此一主題從事研究，可從非預期性變數如何獲得，及再利用其他貨幣政策指標重新檢驗，甚至不同的計量技術等方面著手。

## 六、參考文獻

- [1] 趙志偉，「貨幣政策對產出物價的非對稱性效果」，國立政治大學銀行系碩士班碩士論文，民國85年6月。
- [2] Ball, L. and Mankiw, N. G. (1994), "Asymmetric Price Adjustment and Economic Fluctuations," *The Economic Journal*, vol.104, p247-261.
- [3] Barro, R. J. (1977), "Unanticipated Money Growth and Unemployment in the United States," *American Economic Review*, vol.67, p.101-15.
- [4] Barro, R. J. (1978), "Unanticipated Money, Output, and the Price Level in the United States," *Journal of Political Economy*, vol.86, p.549-80.
- [5] Barro, R. J. and Rush, M. (1980), "Unanticipated Money and Economic Activity," *Rational Expectations and Economic Policy*, Stanley Fisher, ed. Chicago, IL: University of Chicago Press.
- [6] Bernanke, B. S., (1990) "On the Predictive Power of Interest Rates and Interest Rate Spreads," *New English Economic Review*, November-December, p.51-68.
- [7] Bernanke, B. S. and A. S. Blinder, (1992) "The Federal Funds Rates and the Channels of Monetary Transmission," *American Economic Review*, vol.82, p.901-921.
- [8] Bollerslev, T. (1986), "Generalized Autoregressive Conditional Heteroscedasticity," *Journal of Econometrics* 31,p301-327.
- [9] Burbidge, J. and A. Harrison, (1984) "Testing for the Effects of Oil-Price Rises Using Vector Autoregressions," *International Economic Review*, Vol.25, No.2, 459-484.
- [10] Chu, J. and Ratti, R. A. (1997), "Effects of Unanticipated Monetary Policy on Aggregate Japanese Output: the Role of Positive and Negative Shocks," *Canadian Journal of Economics*, p.724-739.
- [11] Cover, J. P. (1992), "Asymmetric Effects of Positive and Negative Money Supply Shocks," *Quarterly Journal of Econometrics*, vol. CVII, p1261-1282.
- [12] DeLong, J. B. and Summers, L. H. (1988), "How Does Macroeconomic Policy Affect Output?" *Brookings Papers on Economic Activity*, vol. 2, p.433-80.
- [13] Engle, R. F. (1982), "Autoregressive Conditional Heteroscedasticity with Estimate of the Variance of the United Kingdom Inflation," *Econometric* 50, p.987-1007.
- [14] Engle, R. F. and Ng, V. K. (1993), "Measuring and Testing the Impact of News on Volatility", *Journal of Finance*, vol. 48, p.1749-1777.
- [15] Ferderer, J. P., (1996) "Oil Price Volatility and the Macroeconomy" *Journal of Macroeconomics*, vol.18, p.1-26.
- [16] Friedman, B. M. and K. N. Kuttner, (1992) "Money, Income, Price, and Interest Rates," *American Economic Review*, Vol.82, No.3, 472-492.
- [17] Hamilton, J. D., (1983) "Oil and the Macroeconomy since World War II" *Journal of Political Economy*, vol.91, p.228-248.
- [18] Hamilton, J. D., (1996) "This is What Happened to the Oil Price-Macroeconomy Relationship" *Journal of Monetary Economics*, Vol.38, 215-220.
- [19] Hooker, M. A., (1996) "What Happened to the Oil Price-Macroeconomy Relationship?" *Journal of Monetary Economics*, vol.38, p.195-213.
- [20] Hooker, M. A., (1996) "This is What Happened to the Oil Price-Macroeconomy Relationship: Reply?" *Journal of Monetary Economics*, vol.38, p.221-222.

- [21] Karras, G. (1996a), "Why Are the Effects of Money-Supply Shocks Asymmetric? Convex Aggregate Supply or Pushing on a String." *Journal of Macroeconomics*, vol.18, p.605-619.
- [22] Karras, G. (1996b), "Are the Output Effects of Monetary Policy Asymmetric? Evidence from a Sample of European Countries." *Oxford Bulletin Economics and Statistics*, vol.58, p.267-78.
- [23] Kashyap, A. K., J. C. Stein, and D. W. Wilcox, (1993) "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance," *American Economic Review*, vol.83, p.78-98.
- [24] Lee, K., S. Ni, and R. A. Ratti, (1994) "Oil Shocks and the Macroeconomy: The Role of Price Variability" Working Paper No.94-10, University of Missouri-Columbia.
- [25] Lown, C. S., (1988) "The Credit-Output Link vs. Money-Output Link: New Evidence," *Economic Review of Federal Reserve Bank of Dallas*, November, p.1-10.
- [26] Morgan, D. P. (1993), "Asymmetric Effects of Monetary Policy," *Federal Reserve Bank of Kansas City Economic Review*, vol.33, p.21-33.
- [27] Mork, K. A., (1989) "Oil and the Macroeconomy When Prices Go Up and Down: An Extension of Hamilton's" *Journal of Political Economy*, vol.97, p.740-744.
- [28] Rhee, W. and Rich, R. W. (1995), "Inflation and the Asymmetric Effects of Money on Output Fluctuations." *Journal of Macroeconomics*, vol.17, p.683-702.
- [29] Shen, C. H. (1996), "Are the Effect of Monetary Policy Asymmetric? The Case of Taiwan." Unpublished Paper, NSC.